a1

increase the bond strength between the polymer matrix and the wires, such primers can further degrade the flexible strength of the wire and limit its malleability, causing premature failure. Additionally, as copper or metallic wires are heated (resistively), their electrical resistance increases proportionately to the temperature increase. In a flexible heater, this means that the amount of power required to achieve a desired temperature must be increased throughout the heating cycle. The relatively high mass of copper or other electrically conductive metal also results in a lag in response time when used as a heating element, thus requiring constant monitoring and adjustment of the power supply.

At page 3, line 3, please amend the paragraph beginning with "Inflatable bladders" to read as follows:

a2

Inflatable bladders that incorporate various heating means have also been used for curing materials impregnated with a thermosetting resin matrix, such as polyester or epoxy based resins. In these resin types, certain chemicals are present that have a detrimental effect on silicone products. Specifically, silicones, when exposed to certain chemicals such as styrene, which is present in many resin systems, and heat, will revert after a limited number of uses into a weak form no longer suitable as an inflation device.

At page 3, line 21, please amend the paragraph beginning with "In view of" to read as follows:

a3

In view of the aforementioned shortcomings associated with the conventional methods of construction and use of flexible, inflatable heaters, there is a strong need for an inflatable heating device containing a heating mechanism that is robust. There is also a strong need for materials that can withstand repeated use in aggressive environments and afford a long life cycle. It will be appreciated that there is also a strong need for an improvement in manufacturing which can reduce production cycle time and capital equipment costs.

At page 4, line 9, please amend the paragraph beginning with "The apparatus" to read as follows:

a4

The apparatus of the present invention is generally characterized by a heating/inflation module having a pressurizable interior and a removably attached heat curable pre-preg. In particular, an elastomeric, seamless composite is provided that includes a heating element disposed within a thermoset resin matrix. The composite is adapted to maintain a consistent temperature profile and an internal air pressure. A first end piece is attached to a first end of the composite and has an air port for communication with a compressed air source, a vacuum port for communication with a vacuum supply source and at least one electrical cable port for communication with a power supply source. A second end piece is attached to a second end of the composite. The apparatus further includes a pre-

a4

preg removably attached to an outer surface of the composite. The pre-preg includes a structural fiber matrix supporting a heat curable resin.

At page 4, line 28, please amend the paragraph beginning with "A method" (which continues to page 5, line 11) to read as follows:

a5

A method for repairing a damaged section of a conduit is also disclosed. A pre-preg is removably attached to an outer surface of an elastomeric composite. The pre-preg and composite described herein may be used in this procedure. A heater/inflation module is produced by providing first and second end pieces respectively attached to first and second ends of the composite. The module with the attached pre-preg is installed into the conduit at a damaged location. The module is then inflated to a predetermined internal air pressure to press the pre-preg against an inside surface of the conduit. The pre-preg resin is cured by causing an electrical current to flow in the heating element of the composite to resistively heat the module to a predetermined temperature. The electrical energy supply and thus the curing cycle may be controlled by conventional means such as a programmable logic controller unit. Finally, the module is deflated such as by providing a vacuum source and removed from the conduit, leaving the permanently cured, resin impregnated liner to protect the damaged section of the conduit.

At page 7, line 1, please amend the paragraph beginning with "Figure 9" to read as follows:

a6

Figure 9 is an exploded cross-sectional view of an end portion of the inflatable heating device of the present invention; and

At page 10, line 29, please amend the paragraph beginning with "Once" (which continues to page 11, line 12) to read as follows:

a7

Once the module 210 is in place, an air compressor (not shown) is engaged to direct air into the interior or inflation chamber 102 of the module 210 through its air line 7. The module 210 is brought to a predetermined pressure to expand the composite 205 within the pipe 1. Consequently, the pre-preg 3 is forced against the interior surface of the pipe section 2 and thus conforms to the internal shape of the pipe 1. Electrical current is then flowed from a remote power source (not shown) through the one or more electrical cables 11 to resistively heat the module 210. As noted earlier, the temperature profile exhibited by the module 210 will depend upon the location and density of the conductive fiber braids 201 of the composite 205. The heat given off by the module 210 is maintained to permit the pre-preg resin to exotherm and thus activate the curing phase. Once the pre-preg 3 has fully cured against the damaged pipe section 2, the module 210 is deflated by engaging a remote vacuum source (not shown) to draw a vacuum

a7 through the vacuum line 10. The module 210 may then be removed from the repaired pipe 1.

At page 13, line 11, please amend the paragraph beginning with "According" to read as follows:

a8 According to another aspect of the invention, the carbon fibers used as the reinforcement and a means for generating heat in the finished module 210 can be used to provide heat to cure the components of the module itself during its manufacture. With the desired lay-up of materials for the module complete, conventional methods are used to consolidate the materials prior to curing, such as wrapping with release tape or web under pressure, enveloping the entire assembly with a membrane or film and drawing a vacuum, or applying a layer of film that, when heated, will shrink and provide compaction. Traditionally, the entire mandrel and composition of the inflatable heater would then be relocated to a curing oven. In the present invention, the carbon fibers are captured at each end and an electric current is introduced. Carbon fibers, being low in mass and with a known conductivity, will rapidly produce heat in a uniform manner. Because the electrical properties of carbon can be readily assumed, precise and uniform heating can be achieved. Also, because the heat source is within the composition of the module, cycle times can be dramatically reduced and excess heat generation is minimized. Energy consumption is far less than traditional methods. This can all be accomplished with the use of an inexpensive power supply as compared to costly ovens. Because the cure cycle is markedly faster than with an oven or the like, heat transfer to the mandrel is reduced thereby providing quicker cool-down and subsequent part removal.